

WHAT IS CLAIMED IS:

- 1 1. A method of detecting cancer in a patient, the method comprising:
2 determining the level of a transcript encoding SEQ ID NO:2 in a biological
3 sample from the patient; and
4 detecting a decrease in the level of the transcript relative to normal, thereby
5 detecting the presence of cancer in the patient.
- 1 2. The method of claim 1, wherein the cancer is selected from a group
2 consisting of lung cancer, breast cancer, mesothelioma, colon cancer, and sarcoma.
- 1 3. The method of claim 1, wherein the step of determining the level of the
2 transcript comprises an amplification reaction.
- 1 4. A method of detecting cancer in a patient, the method comprising:
2 determining the level of a polypeptide having the sequence set forth in SEQ
3 ID NO:2 in a biological sample from the patient; and
4 detecting an increase in the level of the polypeptide relative to normal, thereby
5 detecting the presence of cancer in the patient.
- 1 5. The method of claim 4, wherein the cancer is selected from the group
2 consisting of lung cancer, breast cancer, mesothelioma, colon cancer, and sarcoma.
- 1 6. The method of claim 4, wherein the step of determining the level of the
2 polypeptide comprises performing an immunoassay.
- 1 7. A method of detecting cancer in a patient, the method comprising:
2 determining the amount of methylation of a SOCS-3 promoter in a biological
3 sample from the patient; and
4 detecting an increase in the amount of methylation of the sample relative to
5 normal, thereby detecting the presence of cancer in the patient.
- 1 8. The method of claim 7, wherein the amount of methylation of the CpG
2 residues that occur within the region from -1005 to -983 or from -754 to -737 of SEQ ID
3 NO:3 is determined.

1 9. The method of claim 7, wherein the amount of methylation of the
2 SOCS-3 promoter is determined using bisulfite sequencing.

1 10. The method of claim 7, wherein the amount of methylation of the
2 SOCS-3 promoter is determined using methylation-specific PCR.

1 11. The method of claim 7, wherein the amount of methylation is detected
2 using a methylation-sensitive restriction enzyme.

1 12. A method of monitoring the efficacy of a therapeutic treatment of
2 cancer, the method comprising the steps of:

3 (i) providing a biological sample from a patient undergoing the therapeutic
4 treatment; and

5 (ii) detecting the level of: a polypeptide having an amino acid sequence of
6 SEQ ID NO:2, or of a nucleic acid that encodes the polypeptide, in the biological sample
7 compared to a level in a biological sample from the patient prior to, or earlier in, the
8 therapeutic treatment, thereby monitoring the efficacy of the therapy.

1 13. A method of monitoring the efficacy of a therapeutic treatment of
2 cancer, the method comprising the steps of:

3 (i) providing a biological sample from a patient undergoing the therapeutic
4 treatment; and

5 (ii) detecting the level of methylation of the SOCS-3 promoter in the
6 biological sample compared to a level in a biological sample from the patient prior to, or
7 earlier in, the therapeutic treatment, thereby monitoring the efficacy of the therapy.

1 14. A method of screening for an agent that increases SOCS-3 activity, the
2 method comprising

3 incubating a test compound with a cell comprising a SOCS-3 nucleic acid
4 having at least 80% identity to SEQ ID NO:1;

5 selecting a compound that increases SOCS-3 activity, thereby identifying an
6 agent that increases SOCS-3 activity.

1 15. The method of claim 14, wherein the SOCS-3 nucleic acid sequence
2 further comprises a hypermethylated promoter.

1 16. The method of claim 15, further comprising a step of determining the
2 amount of methylation of the SOCS-3 promoter following incubation with the test
3 compound.

1 17. The method of claim 14, wherein the increase in SOCS-3 activity is
2 determined by measuring the level of SOCS-3 mRNA transcript.

1 18. The method of claim 14, wherein the increase in SOCS-3 activity is
2 determined by measuring the level of SOCS-3 polypeptide.

1 19. A method of inhibiting proliferation of a cancer cell, the method
2 comprising administering an agent that increases SOCS-3 activity to the cancer cell.

1 20. The method of claim 19, wherein the cancer cell has a hypermethylated
2 SOCS-3 promoter.

1 21. The method of claim 20, wherein the cancer cell is selected from the
2 group consisting of a lung cancer cell, a breast cancer cell, a mesothelioma cell, a colon
3 cancer cell, and a sarcoma cell.

1 22. The method of claim 19, wherein the agent is an expression vector
2 encoding SOCS-3.

1 23. The method of claim 19, wherein the agent is recombinant SOCS-3.

1 24. The method of claim 19, wherein the agent is a demethylating agent.

1 25. A kit comprising methylation-specific primers that are selective for
2 methylated residues present within the region from -1005 to -983 or from -754 to -737 of
3 SEQ ID NO:3.

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